PATENT SPECIFICATION

Application Date: Oct. 25, 1935. No. 29459/35. **461,025**

Complete Specification Left: Oct. 26, 1936.

Complete Specification Accepted: Feb. 9, 1937.

PROVISIONAL SPECIFICATION

Improvements in Lock Mechanism in which there is a Rotatable Plug Secured by Transversely Slidable Plates or Tumblers

We, JOSIAH PARKES AND SONS LIMITED, of Union Works, Willenhall, in the County of Stafford, a Company incorporated under the laws of Great Britain, and EDWARD CAMDEN FRYER and FRANCIS JOSEPH BUTTER, both of the Company's address, and both subjects of the King of Great Britain, do hereby declare the nature of this invention to be as follows:—

The invention relates to the type of lock mechanism in which there is a rotatable plug secured in its locked position by plates or tumblers slidable transversely in the plug, the plates or tumblers being formed, and arranged in the plug, in such a manner that the effect of inserting the key into the plug is to draw in the plates or tumblers to such positions that their ends coincide with the surface of the plug and allow it to be turned.

Heretofore or usually in such lock mechanism the key has operated to impel all the plates or tumblers in the same direction against the force of suitable springs or else each plate or tumbler has been movable in both directions by positive engagement of a key.

According to the present invention there are two sets of tumblers or plates, the tumblers of the one set being arranged to project, when in the locking position, from a different part of the periphery from that from which the tumblers of the other set project, said parts being preferably diametrically opposite parts; and the tumblers of one set are impelled inward by one edge or ledge of the key and the other set by the other edge or another ledge of the key. The tumblers are impelled outward by suitably arranged spring pressure.

It is preferred that each tumbler of each set be paired with a tumbler of the other set and that the tumblers of each pair be impelled outward by a common spring placed between an abutment of the one tumbler and an abutment of the other.

Each tumbler may be in the form of a plate with an aperture formed clear through to receive the key, one end of the aperture forming the engagement surface for the respective edge of the key, while the other end is arranged to be at all times clear of the other edge of the key.

The two tumblers of a pair may be laid face to face and each may have a sideway projection to act as the abutment for the spring. Each such projection may be of double the thickness of the tumbler and pass across the respective edge of the other tumbler. In this manner the spring may act normally and centrally on each abutment and the projection of each tumbler may act as a guide to the other.

Each pair of tumblers may lie in a separate compartment in the plug, such compartments being formed by partition plates lying in grooves formed in the sides of an axial compartment in the plug. These partition plates have each a central aperture to clear the key and each may be kept in position by a longitudinally and radially disposed plate lying in a radial slot in the plug and engaging at its inner edge in notches formed in the edges of the plates.

Each tumbler, in the edge which is opposite the abutment projection, may have a relatively long recess within which the inner edge of the radial plate may lie, the ends of the recess then forming stops to limit the movement of the tumbler in either direction.

By removing the radial plate, the partition plates and tumblers are left free for removal.

The springs which tend to impel the tumblers of the pairs in opposite directions are preferably small coil springs lying in recesses open to the interior of the plug.

The partition plates may act as ward plates, their central openings being formed to coincide with the cross-sectional shape of the key; and, if such shape is irregular, the effective shape of the plates can be varied by disposing them the reverse way, in either direction, thus giving four variations of ward plates with a single set of partition plates all alike.

The partition plates may be formed integral with the plug, especially if the

[*Price* 1/-]

latter is made as a die casting.

In lieu of the tumblers having central openings for the key to pass through, they may simply have sideway recesses for such purpose, or each tumbler may be of pin form with a sideway projection to engage across an edge or ledge of the key.

The ends of the recesses in the tumblers may engage against the contour of an irregular ledge on the side of the key, or one on each side thereof, in which case the web of the key may pass through clearance slots cut in the end edges of the recesses in the tumblers.

A great advantage of providing two sets of tumblers as above described lies in the greatly increased number of key variations thereby made possible for a given length of key.

Another advantage of the construction is that the plug is locked in the bore of its cylinder or other bore at two parts of its periphery which may be diametrically opposite each other.

Dated this 24th day of October, 1935.

STEPHEN WATKINS, SON & GROVES,
Chartered Patent Agents,
Metropolitan Chambers, Wolverhampton,
Agents for the Applicants.

COMPLETE SPECIFICATION

Improvements in Lock Mechanism in which there is a Rotatable Plug Secured by Transversely Slidable Plates or Tumblers

We, JOSIAH PARKES AND SONS LIMITED, of Union Works, Willenhall, in the County of Stafford, a Company incorporated under the laws of Great Britain, and EDWARD CAMDEN FRYER and FRANCIS JOSEPH BUTTER, both of the Company's address, and both subjects of the King of Great Britain, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The invention relates to the type of lock mechanism in which there is a rotatable plug secured in its locked position by two sets of plates forming tumblers slidable transversely in the plug, the tumblers of the one set projecting from one part of the periphery of the plug, and the tumblers of the other set projecting from a part of the periphery which is diametrically opposite or substantially so. In one known construction all the tumblers of both sets are housed in a common chamber of the plug and all impelled outwardly by a common spring. In patent specification No. 422,093 there is described a construction in which the tumblers are arranged in pairs each pair in a separate transverse slot of the plug, and the construction claimed is one in which the tumblers of each pair are impelled apart by a separate spring compressed between them. The tumblers have had each an inwardly extending sideway projection to engage with a wavy groove in the side of the key. The plug was divided longitudinally into two parts to allow of the insertion of the tumblers in the respective slots.

The present invention has for its object to effect improvements in a lock of the general type above specified.

According to one feature of the invention the tumblers are arranged in pairs each pair comprising a tumbler of each set, and the plug is formed as an integral part, that is to say it is not divided longitudinally, and the arrangement is such that the tumblers of each pair, pressed apart by a common spring, can be inserted in a separate transverse slot in the plug from the periphery thereof, and secured in position by a suitable member which may act also as means to limit the travel.

According to another feature of the invention each tumbler of a pair has a sideway projection from one of its side edges said projection being thickened or caused to extend into the plane of the other tumbler of the pair and form a guide for the respective edge thereof and an abutment for the common spring. This construction makes it possible to insert one member of the pair first, then to insert the spring to rest on the abutment of the said tumbler, then to insert the other tumbler with its abutment resting on the spring and finally to put in place the retaining device if it is a separate member.

According to another feature of the invention each slot to contain a pair of tumblers extends right across the key slot each tumbler having a hole or recess through which the key passes. The tumblers of one set are impelled inwardly by one edge or ledge of the key and the other set by the other edge or another ledge of the key.

Each tumbler may be in the form of a plate with a hole formed clear through to receive the key, one end of the hole forming the engagement surface for the respective edge of the key, while the other end is arranged to be at all times clear

of the other edge of the key.

Shoulders in the apertures in the tumblers or the ends of side recesses therein may engage against the contour of an irregular ledge on the respective side face of the key, in which case the web of the key may pass through clearance slots in the tumblers.

Convenient embodiments of the invention are described with reference to the drawings herewith in which:—

Figure 1 is a side elevation of the barrel of a cylinder lock having tumblers constructed and operated according to the invention and shown protruding from the periphery of the barrel.

Figure 2 is a plan view of the barrel shown in Figure 1.

Figure 3 is a section taken on the line 3, 3, of Figure 1.

Figure 4 is a section taken on the line 4, 4, of Figure 1.

Figure 5 is a face view of one of the tumblers of one of the two sets of tumblers.

Figure 6 is a plan view of the tumbler shown in Figure 5.

Figure 7 is a face view of a tumbler of the other set and intended to be paired with the tumbler shown in Figure 5.

Figure 8 is a plan view of the tumbler shown in Figure 7.

Figure 9 is a longitudinal section of the barrel with the key inserted and holding in all the tumblers.

Figure 10 is a transverse section taken in the plane indicated by the line 10, 10 of Figure 9.

Figure 11 is a fragmentary view in longitudinal section showing one end of the barrel and one pair of tumblers and also the key about to be entered into the barrel.

Figure 12 is a view somewhat corresponding to Figure 9, but showing a modification, and showing the tumblers in their normal or outmost positions.

Figure 13 is a transverse section taken in the plane indicated by the line 13, 13, of Figure 12.

Figure 14 is a transverse sectional view to show a further modification and showing the tumblers in their inmost position; and,

Figure 15 is a side elevation of the key shown in section in Figure 14.

Referring first to Figures 1 to 11, A is the plug of the lock, the surrounding body of which is not shown as it may be of ordinary construction. The bore in the body has two longitudinal grooves oppositely disposed to receive the ends of the tumblers as usual. The part or parts which are operated by the plug are also not shown as they form no part of the invention.

The plug has formed through it a number of narrow chambers a divided by partitions b which are integral with the plug, the latter being conveniently made as a diecasting. Each of the partitions has an aperture b^1 to receive the key C. In each chamber a is placed a pair of tumbler plates d d^1 of which d is one of a set of tumbler plates adapted to project (when in the locked position) upwardly from the periphery of the plug (see Figure 1), while d^1 is one of a set of tumbler plates adapted to project downwardly from the periphery. Each of the plates d has, near the top of its right hand edge, a sideway projection d^2 which is thickened somewhat in a forward direction (see Figure 6) and each plate d^1 has near its lower end a similar projection d^3 but thickened rearwardly (see Figure 8). A coil spring e, in respect of each pair of plates, is placed between these projections tending to press the plate d upwardly and the plate d^1 downwardly. Each of the plates d d^1 has two projections d^4 d^4 from its left hand edge forming stops which engage against a longitudinal but radially disposed plate f whereby their movement in either direction is limited. The plate f therefore forms the means for keeping the plates d d^1 in position in the plug. It is laid within a radial slot formed in the plug.

Each of the plates d has a long aperture d^5 and the lower edge d^6 of this aperture is so positioned that, when the key is fully inserted in the plug, it presses the plate down until its top and bottom edges come flush with the periphery of the plug. In like manner the key presses up the plate d^1 until its bottom and top edges come flush with the periphery of the plug. In Figure 1 the plates are all shown projecting from the periphery that is in the locked position, whereas in Figure 9 they are shown as all drawn back by the key. The plates may have their apertures in varying positions and the key has its two edges so shaped that, when it is inserted in the plug, it brings all the plates to the flush positions thus allowing the key to turn the plug.

It will be seen by reference more especially to Figure 3, that, prior to the insertion of the plate f, the one tumbler of a pair, say d, can be inserted first and from the periphery of the plug and then the spring e and the other tumbler d^1 are inserted, after which they are secured in place by the insertion of the plate f.

In the modification shown in Figures 12 and 13 the partitions or walls b are formed as separate plates slid into grooves in the interior of the plug and they are

kept in position by the plate *f* which enters a side notch b^2 of each plate *b*. It will be seen by reference to Figure 13 that the key C is formed with a longitudinal groove *c* in one side face and into this groove enter projections or bullets b^3 of the plates *b*. Thus these latter act as guard plates preventing the insertion of a key which has not a groove correctly disposed. They also ensure the alignment of the key in the barrel. The provision of bullets and a grooved key may be made in the other modifications also. An advantage of using separate partition plates is that each can be placed in the barrel in four ways and if the aperture is suitably shaped it provides four variations of key-section.

In the modification shown in Figures 14 and 15 the construction is similar to that shown in Figures 1 to 11 but in this case the key has straight edges c^1 but shaped ledges c^2 to co-act with shoulders d^1 d^1 in the apertures in the plates *d* d^1.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. Lock mechanism of the type set forth and in which the tumblers are arranged in pairs, each pair comprising a tumbler of the one set and a tumbler of the other set and each pair being housed in a separate transverse slot of the plug, characterised in that the plug is not divided longitudinally but formed as an integral part the arrangement being such that tumblers of each pair, pressed apart by a common spring, can be inserted in the respective slot in the plug from the periphery thereof and secured in position by a suitable member which may act also as means to limit the travel of the tumblers.

2. Lock mechanism as in Claim 1, further characterised in that each tumbler of a pair has a sideway projection from one of its side edges, said projection being thickened or caused to project into the plane of the other plate of the pair and form a guide for the respective edge thereof and an abutment for the common spring.

3. Lock mechanism as in Claim 1 or in Claim 2 further characterised in that each slot to contain a pair of tumblers extends right across the key slot each tumbler having a hole or recess through which the key passes.

4. Lock mechanism as in Claim 3, characterised in that the walls between the slots in the plug are formed as separate plates each with an aperture to allow the key to pass through.

5. Lock mechanism as in Claim 4, further characterised in that the said partition plates are kept in position by a plate lying within a longitudinally and radially disposed slot of the plug, the plate entering notches cut in the respective sides of the partition plates.

6. Lock mechanism as in Claim 5, further characterised in that said radially disposed plate acts also as the means for retaining the tumblers in the plug by engaging, at its inner edge, between two shoulders of the respective edge of each tumbler plate.

7. Lock mechanism constructed substantially as described with reference to the several modifications illustrated in the drawings herewith.

Dated this 24th day of October, 1935.
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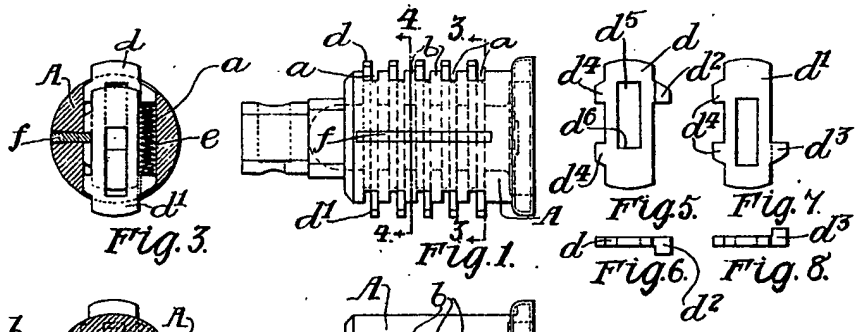
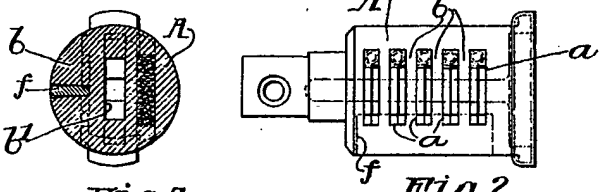
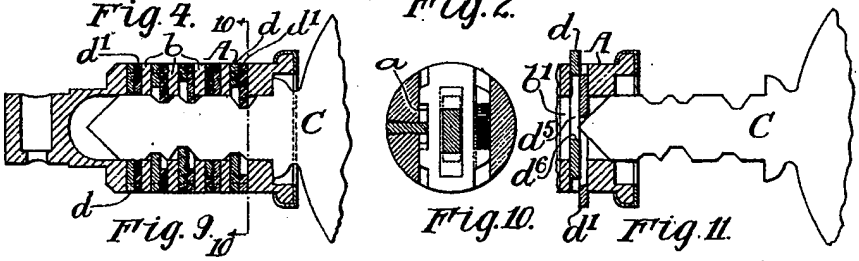
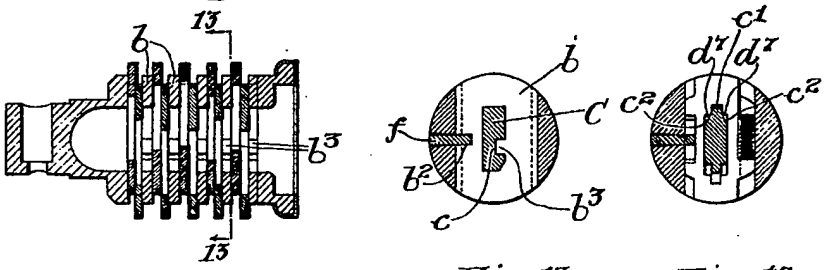
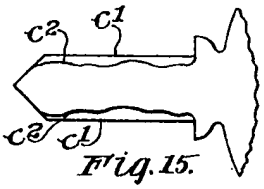
Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1937.











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